

	Find the number of two-digit natural numbers such that the tens digit is greater than the units digit.	When Jason arranges his toy soldiers in rows of 6, he has 1 left over. When he arranges them in rows of 8, he has 3 left over. When he arranges them in rows of 10, he has 5 left over. What is the smallest possible number of toy soldiers that Jason plays with?	The sum of the digits of a two-digit prime number is subtracted from the number. Prove that the difference cannot be a prime number.
	1	2	3
A and B are distinct one-digit composite numbers. Find all values of A and B such that $AB - (A + B)$ is prime.	Find the number of three-digit natural numbers such that the hundreds digit is greater than the sum of the tens and units digits.	At 10 10/11 minutes after 5:00, the minute hand and the hour hand make a 90° angle. When will these two hands next make a 90° angle?	Heidi keeps track of her scores when she plays her favorite board game. The mean of her six best scores was 243 until today, when she replaced her sixth-best score with 237. If the new mean of her six best scores is 246, by how many points has her sixth-best score increased?
4	5	6	7
A regional planning board must select one of three competing routes for a light rail project. Because of cost considerations, route B is 10% more likely to be selected than route A, and route C is 20% more likely to be selected than route A. What is the probability that route C will be selected?	A mother has two children whose ages differ by 5 years. The sum of the squares of their ages is 97. The square of the mother's age can be found by writing the squares of the children's ages one after the other as a four-digit number. How old is the mother?	A square centered at the origin has its vertices on the x - and y -axes. The graph of the function $f(x) = ax^2 - 4$, $a > 0$, passes through three of the square's vertices. Find a .	Layla added 2 tablespoons of cream to $1\frac{3}{4}$ cups of black coffee. She drank $1\frac{1}{4}$ cup of this mixture and decided to add 1 more tablespoon of cream. She tasted her drink again and judged it "perfect." What percent of the "perfect" coffee drink is cream?
8	9	10	11
Every student in a ninth-grade class is a member of the Rubik's cube club or the origami club. Twenty-eight students belong to the Rubik's cube club, $\frac{5}{6}$ of the students belong to the origami club, and $\frac{1}{2}$ the students belong to both clubs. How many students belong to the origami club but not to the Rubik's cube club?	The 20th term of an arithmetic sequence exceeds the 12th term by 64. If the units digit of the 20th term is 5, what is the units digit of the 2012th term?	Over the centuries the following numbers have been used as approximations for π : $355/113$, $22/7$, $(3 + 8/60 + 30/60^2)$, $\sqrt{10}$, $3\frac{1}{8}$, $2\frac{2}{3}$, $864/275$ Order the numbers from smallest to largest. Place π in the list to see which approximations overestimate and which underestimate π .	We are given the quadratic equation $x^2 - bx - 36 = 0$. If the sum of the reciprocals of the roots is $\frac{4}{9}$, what is the sum of the roots?
12	13	14	15
Two bicyclists start at the same location on a large, dry lake bed. They ride exactly 1 mile in opposite directions. Then each tosses a fair coin and makes a 90° turn—right if heads, left if tails. Each rides 1 mile in the new direction, and each repeats the coin toss procedure before riding a third mile. What is the probability that the bicyclists meet at the end of their 3-mile ride?	In what base will the following multiplication be true? $\begin{array}{r} 2012 \\ \times 3 \\ \hline 11041 \end{array}$	The coordinate of point A on a number line is -5 , whereas the coordinate of point B is 3. Find the coordinates of all points P on \overline{AB} such that P is twice as far from A as from B .	The product of three positive, consecutive odd integers is 15 times their sum. Find the three integers.
16	17	18	19
If $xy - 1/6 = y - x = 3 - x - y$, what is the value of $x + y$?	A cube is inscribed in a sphere with diameter 9 in. What is the volume of the cube?	The arithmetic mean of two positive integers exceeds the positive geometric mean by $1/2$. If one of the integers is 4, what is the value of the other integer?	Quadrilateral $ABCD$ is a square. Points Q , R , S , and T are the midpoints of its sides, and segments are drawn from them to the vertices, as shown. If a side of $ABCD$ is 2 in., what is the area of square $KLMN$?
20	21	22	23
What is the area of the quadrilateral with vertices $A(0, 2)$, $B(15, 10)$, $C(15, 2)$, and $D(0, -18)$?	Find the number of four-digit natural numbers such that the digit in the thousands place is greater than the sum of the digits in the hundreds, tens, and units places.	Given point $A(-5, 0)$ and point $B(3, 0)$, find the equation of the locus of all points P in the xy -coordinate plane such that P is twice as far from A as from B .	Square $ABCD$ has side length 2. The midpoints of the sides are connected to the vertices, as shown. $ABCD$ is centered at the origin, with its sides parallel to the x - and y -axes. Find the coordinates of the vertices of square $KLMN$.
24	25	26	27
The net for a three-dimensional figure has length 3 ft. and width $1.57 \approx \pi/2$ ft. What volume will the figure enclose when the net is folded up?	A regular hexagon with side length 3 in. is cut from a sheet of paper. One radius is cut; the others are creased. Two pairs of triangles are overlapped to form a square pyramid. What is the volume of the pyramid?	A regular hexagon with side length 3 in. is cut from a sheet of paper. One radius is cut; the others are creased, as in problem 29. Three triangles are overlapped to form a triangular pyramid, or tetrahedron. What is the volume of the pyramid, and how does this volume compare with that of the square pyramid created in problem 29?	When every diagonal is drawn in a regular octagon, we see an inner octagon surrounded by a ring of isosceles trapezoids. The diagonals divide each trapezoid into one convex pentagon and one nonconvex pentagon. What is the ratio of the areas of these two pentagons?
28	29	30	31